CLAIMS

We claim:

1. A method for identifying a gene whose expression level is associated with a disease state, the method comprising:

identifying at least one gene having a nucleic acid sequence encoding a protein comprising a physical characteristic;

selecting a polynucleotide sequence from the nucleic acid sequence, wherein the polynucleotide sequence is specific for a protein comprising the physical characteristic;

detecting a level of expression of the polynucleotide sequence or a complement thereof in a diseased tissue sample;

detecting a level of expression of the polynucleotide sequence or a complement thereof in a normal tissue sample; and

comparing the level of expression of the polynucleotide sequence or a complement in the diseased tissue sample to a level of expression of the gene in the control tissue sample, wherein an altered level of expression of the polynucleotide sequence or a complement in the diseased tissue sample correlates with the disease state.

2. The method of claim 1, wherein the physical characteristic comprises seven transmembrane (7-TM) domains.

3. The method of claim 2, wherein the gene is a novel G-protein linked cell receptor type gene.

4. The method of claim 1, wherein the physical characteristic comprises an amino acid sequence comprising an Asp-Arg-Tyr (DRY) motif.

5. The method of claim 4, wherein the gene is a novel G-protein linked cell receptor type gene.

6. The method of claim 1, wherein the physical characteristic comprises a signal peptide sequence characteristic of a secreted protein.

7. The method of claim 1, wherein the physical characteristic comprises a signal peptide sequence characteristic of a mitochondrial protein.

8. The method of claim 1, wherein the physical characteristic comprises an amino acid sequence characteristic of a structural feature of the protein.

9. The method of claim 1, wherein the physical characteristic comprises an amino acid sequence characteristic of a function of the protein.

10. The method of claim 1, wherein the identification of the gene comprises searching a nucleic acid sequence database for nucleic acid sequences which encode a protein comprising the physical characteristic.

11. The method of claim 10, wherein the nucleic acid sequence database is an electronic library.

12. The method of claim 10, wherein the gene is identified using a search algorithm.

13. The method of claim 1, wherein the identification of the gene comprises selecting at least one gene whose expression is known to correlate with a disease state.

14. The method of claim 1, wherein the detection of the level of expression of the polynucleotide sequence comprises:

selecting at least one isolated oligonucleotide comprising the polynucleotide sequence or a fragment thereof;

contacting the oligonucleotide with a nucleic acid preparation from the tissue sample; and

detecting a level of expression of the polynucleotide sequence by detecting an amount of hybridization of the nucleic acid preparation to the oligonucleotide under stringent conditions.

15. The method of claim 14, wherein the oligonucleotide is attached to a solid support.

16. The method of claim 15, wherein the solid support is a microarray.

17. The method of claim 14, wherein the selection of the polynucleotide sequence comprises determining at least one of a set of factors comprising (i) a redundancy of the sequence, (ii) an efficiency of hybridization to a complementary sequence, and (iii) a likelihood of the polynucleotide sequence comprising an intron.

18. The method of claim 14, wherein the nucleic acid preparation from the tissue sample comprises a detectable label.

19. The method of claim 18, wherein the detectable label is selected from the group consisting of a fluorescent label, an enzymatic label, a chemiluminescent label, a colorimetric label, and a radioactive label.

20. The method of claim 14, wherein the nucleic acid preparation from the tissue sample is amplified before detection.

21. The method of claim 20, wherein the amplification is a conducted by a polymerase chain reaction (PCR).

22. The method of claim 20, wherein the amplification is a conducted by a quantitative polymerase chain reaction (QPCR).

23. The method of claim 1, wherein comparing the level of expression of the gene comprises:

providing at least one isolated oligonucleotide comprising the polynucleotide sequence or a fragment thereof;

contacting the oligonucleotide with an amount of nucleic acid preparation from a disease tissue sample;

contacting the oligonucleotide with an equal amount of nucleic acid preparation from a normal tissue sample; and

comparing the level of expression of the polynucleotide sequence in the tissue samples by detecting an amount of hybridization of each nucleic acid preparation to the oligonucleotide under stringent conditions.

24. The method of claim 23, wherein the polynucleotide is attached to a solid support.

25. The method of claim 24, wherein the solid support is a microarray.

26. The method of claim 23, wherein the nucleic acid preparation is an RNA preparation.

27. The method of claim 26, wherein the RNA preparation is further processed to generate a labeled nucleic acid probe.

28. The method of claim 27, wherein the labeled nucleic acid probe comprises a label coupled to the probe, wherein the label is selected from the group consisting of a biotin, an avidin, a streptavidin, an antibody, an antigen, a peptide, a fluorescent label, an enzymatic label, a chemiluminescent label, a colorimetric label, and a radioactive label.

29. A method for detecting an expression of a gene identified by the method of claim 1 in a cell, the method comprising:

cloning a polynucleotide fragment comprising a sequence of the cloned gene in an expression vector; and

detecting a corresponding protein in a cell transformed with the vector comprising the cloned fragment.

30. The method of claim 29, wherein the protein is detected by an antibody.

31. The method of claim 29, wherein the protein is detected by a monoclonal antibody.

32. A method for preparing an antibody specific for a polypeptide product of a gene identified by the method of claim 1, the method comprising:

cloning a polynucleotide fragment comprising a sequence of the cloned gene in an expression vector;

isolating a polypeptide expressed by the vector, wherein the polypeptide comprises an amino acid sequence corresponding to the cloned polynucleotide;

immunizing an animal with the isolated polypeptide; and

isolating anti-peptide antibodies specific for the isolated polypeptide from the immunized animal.

33. An isolated novel polynucleotide comprising a gene whose expression level is associated with a disease state, the polynucleotide comprising a nucleic acid sequence encoding a protein comprising a physical characteristic, wherein the polynucleotide or a fragment thereof is differentially expressed in a diseased tissue sample as compared to a normal tissue sample.

34. The isolated polynucleotide of claim 33, comprising a nucleic acid sequence which encodes a protein comprising at least one of the characteristics of: (a) seven transmembrane (7-TM) domains, (b) an amino acid sequence comprising an Asp-Arg-Tyr (DRY) motif and (c) a signal peptide.

35. The isolated polynucleotide of claim 33, wherein the polynucleotide comprises a detectable label.

36. The isolated polynucleotide of claim 33, wherein the polynucleotide, or fragment thereof, is attached to a solid support.

37. The isolated polynucleotide of claim 33, wherein the polynucleotide is single stranded.

38. The isolated polynucleotide of claim 33, wherein the polynucleotide is double stranded.

39. A host cell, comprising the isolated polynucleotide of claim 33.

40. An array comprising at least two polynucleotides according to claim 33.

41. A composition, comprising a test cell sample and an isolated polynucleotide according to claim 33.

42. An electronic library comprising at least one isolated polynucleotide according to claim 33.

43. An isolated polynucleotide comprising:

(a) a polynucleotide having sequences shown in Figures 1B, 2B, 3B, 4B and 5B (SEQ ID NOS 1-5), or its complement;

(b) a fragment of the polynucleotide having the sequence shown in Figures 1B, 2B, 3B, 4B and 5B (SEQ ID NOS 1-5), or its complement, wherein the fragment is at least 10 nucleotides in length; or

(c) a polynucleotide that selectively hybridizes to the sequences shown in Figures 1B, 2B, 3B, 4B and 5B (SEQ ID NOS 1-5) or the fragment in (b),

wherein expression of the isolated polynucleotide correlates to a state of disease.

44. The isolated polynucleotide of claim 43, comprising a segment of up to at least 20, 30, 40, 50, 60, 70, 80, 90, 100, 200, 300, 400, 500, 1000 or 1500 nucleotides in length which corresponds identically to a portion of the sequences shown in Figures 1B, 2B, 3B, 4B and 5B (SEQ ID NOS 1-5).

45. The isolated polynucleotide of claim 43, wherein the polynucleotide comprises a detectable label.

46. The isolated polynucleotide of claim 43, wherein the polynucleotide is attached to a solid support.

47. The isolated polynucleotide of claim 43, wherein the polynucleotide is single stranded.

48. The isolated polynucleotide of claim 43, wherein the polynucleotide is double stranded.

49. The isolated polynucleotide of claim 43, wherein expression levels of the polypeptide correlate to a state of Parkinson's disease, Alzheimer's disease, or leukemia.

50. A host cell, comprising the isolated polynucleotide of claim 43.

51. An array comprising at least two polynucleotides according to claim 43.

52. A composition, comprising a test cell sample and an isolated polynucleotide according to claim 43.

53. A kit for diagnosing a disease in a test sample, the kit comprising at least one isolated polynucleotide according to claim 43.

54. An electronic library comprising at least one isolated polynucleotide according to claim 43.

55. An isolated polypeptide, or a fragment thereof, whose expression levels in a tissue correlates to a disease state of the tissue, wherein the polypeptide comprises the amino acid sequence encoded by the polypeptides shown in Figures 1C, 2C, 3C, 4C and 5C (SEQ ID NOS 6-10), or a fragment thereof.

56. The isolated polypeptide of claim 55, wherein the disease state is selected from the group consisting of central nervous system (CNS) disease, Parkinson's disease, Alzheimer's disease and leukemia.

57. The isolated polypeptide of claim 55, wherein expression levels of the polypeptide correlate to a state of CNS disease, Parkinson's disease, Alzheimer's disease, or leukemia.

58. The isolated polypeptide of claim 55, wherein the polypeptide comprises a fragment that includes an antigenic epitope comprising the amino acid sequence shown in Figures 1C, 2C, 3C, 4C and 5C (SEQ ID NOS 6-10).

59. The isolated polypeptide of claim 55, wherein the polypeptide or fragment thereof, is attached to a solid support.

60. An isolated antibody, or antigen binding fragments thereof, that bind to the polypeptide according to any one of claims 55.

61. The isolated antibody of claim 60, wherein the antibody is a polyclonal antibody.

62. The isolated antibody of claim 60, wherein the antibody is a monoclonal antibody.

63. The isolated antibody of claim 60, wherein the antibody is attached to a solid surface.

64. The isolated antibody of claim 60, wherein the antibody comprises a detectable label.